

Claims

1. An instrument for measuring blood cell deformability comprising:

a disposable blood test kit (20) for directly containing the blood sample,

a light emitting unit (10) disposed above said disposable blood test kit (20),

a measurement unit (30) for measuring the blood cell deformability,

said disposable blood test kit (20) comprises a tiny blood sample pot (21) for containing the blood sample, a slit channel (22) for flowing the blood sample by the pressure difference, and a tiny waste blood pot (23) for collecting the tested blood sample,

said measurement unit (30) comprises a differential pressure generator (33) connected to the disposable blood test kit (20) through a connecting tube and a valve (32) for generating the pressure difference between the tiny blood sample pot (21) and tiny waste blood pot (23), a pressure gauge (34) connected to the differential pressure generator (33) and the disposable blood test kit (20) for measuring the pressure difference, a screen (31) for projecting the diffracted image of the blood cell, an image capturing unit (35) for capturing the diffracted images, a control unit (36) for calculating the blood cell deformability, variation of the shearing force, and deformation on time based on data received from the pressure gauge (34) and the image capturing unit (35), an output unit (37) for printing the calculated information on the sheet or displaying on an LCD screen, and a memory unit (38) for storing the calculated information and images.

2. An instrument for measuring blood cell deformability as claimed in claim 1,

wherein said differential pressure generator (33) is connected to the tiny waste blood pot (23) of the disposable blood test kit (20) through a connecting tube and a valve (32) for generating vacuum pressure at the tiny waste blood pot (23), so that the blood sample flows toward the tiny waste blood pot (23) through the slit channel (22).

3. An instrument for measuring blood cell deformability as claimed in claim 1, wherein said differential pressure generator (33-1) is connected to the tiny blood sample pot (21) of the disposable blood test kit (20) through a connecting tube and a valve (32) for generating positive pressure at the tiny blood sample pot (21), so that the blood sample flows toward the tiny waste blood pot (23) through the slit channel (22).

4. An instrument for measuring blood cell deformability as claimed in claim 1, wherein said slit channel (22) is optically transparent and has a clearance with a rectangular shape.

5. An instrument for measuring blood cell deformability as claimed in claim 1, wherein said disposable blood test kit (20) is made of a transparent material such as a silicon, silica, quartz, glass, polymer produced by laser, extruded polymer or ceramics.

6. An instrument for measuring blood cell deformability as claimed in claim 1, further comprises a heat control device such as a thermo-electric component, a

temperature control block or a hot-cold water jacket, or a halogen-lamp for adjusting and maintaining constant testing temperature surrounding the disposable blood test kit.

5 7. An instrument for measuring blood cell deformability as claimed in claim 1, wherein said image capturing unit (35) enables capturing the diffracted image of the deformed blood cell by projecting on the screen.

10 8. An instrument for measuring blood cell deformability as claimed in claim 1, wherein said image capturing unit (35) enables directly capturing the diffracted image of the deformed blood cell without projecting on the screen.

15 9. An instrument for measuring blood cell deformability as claimed in claim 1, wherein said image capturing unit (35) could use either a CCD sensor array, CCD camera, digital camera, web camera or video camera.

20 10. An instrument for measuring blood cell deformability as claimed in claim 1, wherein said light-emitting unit (10) is adopted as either a Laser Diode or Light Emitting Diode (LED).

25 11. An instrument for measuring blood cell deformability as claimed in claim 1, wherein said control unit (36) calculates blood cell deformability and shearing force as a function of time according to pre-calculated data instead of applying instantly measured pressure data.